

BANNED CHEMICALS AND OTHER MYTHS

In 2005, CLEAPSS was commissioned by the Royal Society of Chemistry (RSC) to investigate whether effective teaching of practical science was being inhibited on spurious health and safety grounds. In particular, we investigated alleged bans on the use of various chemicals or particular procedures that were commonly used in the past. The full report, *Surely That's Banned?*, is available on the RSC web site - there is a link to this from the CLEAPSS web site, www.cleapss.org.uk. A paper copy of the main report (without the statistical appendices) was sent to all secondary schools in autumn 2006.

As part of the research, a questionnaire was sent both to schools and local authority officers. Included in this was a list of 40 chemicals or procedures that some callers to the CLEAPSS *Helpline* had thought banned. Of these, only two were banned nationally, although most of the others require a risk assessment and in some cases involve some restrictions. Over 60% of the local authority officers who replied stated that their authority had no additional bans. However, schools were under the impression that much, much more was banned or discouraged. Hence the science curriculum for many children was being impoverished unnecessarily.

This leaflet is an attempt to overcome these mistaken views. It lists the 40 chemicals or activities in the original questionnaire, comments on any bans and gives guidance on where to obtain further information about the healthy and safe use of the chemical or procedure. Unless otherwise indicated, the publications referred to are all on the members' section of the CLEAPSS web site www.cleapss.org.uk. Access to the relevant part of the CLEAPSS web site requires a username and password. These are changed from time to time and the information circulated to members. However, if you cannot find the information, telephone the CLEAPSS *Helpline* 01494 728422. Unless recently up-dated, the publications are also on the latest CLEAPSS *Science Publications CD-ROM* and member-schools and colleges may copy it onto stand-alone computers, laptops or onto school networks as long as these are secure. Do **not** rely on paper publications, especially the CLEAPSS *Laboratory Handbook*, unless you are sure it has been kept up to date.

We have also expanded the list beyond the original 40 items and expect to add to this in the future if more myths come to light. Updated versions of this leaflet will appear on the CLEAPSS web site from time to time. **If there are other chemicals or activities which schools believe may be banned, please contact our *Helpline* (01895 251496 or e-mail science@cleapss.org.uk). We will be able to confirm whether they really are banned nationally or, more probably, tell you where to find a model risk assessment and/or CLEAPSS guidance on how to carry out the activity or use the chemical safely.**

Please note that this table only gives information about **national bans**. **It is possible that a particular employer may have banned something that is not banned nationally, although this is unlikely.** Under section 13 of the *Management of Health and Safety at Work Regulations* all employers are obliged to ensure that new staff, or those newly-promoted or whose job changes significantly, are provided with adequate health and safety training. Self-evidently, this would include informing staff about any local bans. If employers fail to ensure adequate training, they have committed a criminal offence. Therefore, if no such training has been provided, it is reasonable to assume that there is no ban issued by the employer.

The employer for staff in most maintained schools (specifically, community and voluntary-controlled schools) is the local authority. The employer in foundation, voluntary-aided schools, academies, free schools and most other independent schools is the governing body but for some independent schools it might be the proprietor or a charitable trust.

In Northern Ireland the employer of teachers is the Education & Library Board for controlled schools, the CCMS (Catholic Council of Maintained Schools) for maintained schools and the Board of Governors in voluntary-grammar schools and integrated colleges. Technicians are, however, employed by the Education & Library Boards, whether in controlled or maintained schools. There are plans to replace the Education & Library Boards by a single Education & Skills Authority but implementation has been delayed and is uncertain at the time of writing.

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
General		
<i>Use of mercury thermometers</i>	<p>Ban (from 2009) under <i>The Controls on Dangerous Substances and Preparations (Amendment) (No. 2) Regulations</i> on the <u>sale</u> of <u>clinical</u> thermometers containing mercury to both the general public and professional users. Existing thermometers can continue in use. Risk assessment needed.</p> <p>Ban (from 2009) under <i>The Controls on Dangerous Substances and Preparations (Amendment) (No. 2) Regulations</i> on the <u>sale</u> of other measuring instruments containing mercury (except antiques) to the <u>general public</u>. Schools are not the general public. Long-term aim to phase out all measuring instruments containing mercury when suitable replacements available. Risk assessment needed.</p>	Only mercury thermometers offer sufficient accuracy in some contexts. See <i>CLEAPSS Laboratory Handbook</i> 10.7.2.
Mainly biology		
<i>Keeping small mammals</i>	No national ban but under the <i>Animals (Scientific Procedures) Act</i> there must be no cruelty to vertebrates. Risk assessment needed.	<i>CLEAPSS Laboratory Handbook</i> , section 14.1. Also guides L52 <i>Small mammals</i> and L56 <i>Housing and keeping animals</i> .
<i>Keeping giant African land snails</i>	No national ban. Risk assessment needed.	<i>CLEAPSS Laboratory Handbook</i> , section 14.1. Also guides L197 <i>Giant African land snails</i> and L56 <i>Housing and keeping animals</i> and leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> .
<i>Inflating a sheep's lung (eg, with bellows)</i>	No national ban. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and <i>CLEAPSS Laboratory Handbook</i> , section 14.7.2.
<i>Using a choice chamber with woodlice</i>	No national ban.	Leaflet PS3 <i>Keeping and using animals and plants: towards a science department policy</i> and <i>CLEAPSS Laboratory Handbook</i> , section 14.1.
<i>Anaesthetisation of Drosophila and similar organisms using ether</i>	No national ban. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> , <i>CLEAPSS Laboratory Handbook</i> , section 14.1.8 and <i>Bulletins</i> 106 and 107.
<i>Bringing spawn of the common frog from a pond into school</i>	No national ban for the common frog or toad (but fully-protected species of amphibians, the Natterjack toad and the Great crested newt, are banned under the <i>Wildlife and Countryside Act</i>).	Guide L206 <i>Tadpoles</i> and leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> .
<i>Dissection of eyeballs</i>	No national ban on eyes from most species but under the <i>Animal By-products (Enforcement) Regulations</i> cattle eyes must be from animals slaughtered at less than 12 months, eyes of sheep and goats from animals slaughtered at less than 12 months or with at least one erupted incisor. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and <i>CLEAPSS Laboratory Handbook</i> , section 14.7.2.
<i>Dissection of hearts</i>	No national ban. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and <i>CLEAPSS Laboratory Handbook</i> , section 14.7.2.
<i>Dissection of rats</i>	No national ban. Risk assessment needed.	Leaflet PS3 <i>Keeping and using animals and plants: towards a science department policy</i> and <i>CLEAPSS Laboratory Handbook</i> , section 14.7.

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
<i>Pupils taking samples of their own cheek cells</i>	No national ban. Was strongly discouraged by DES in 1980s, but later modified. Almost all local authorities rescinded their bans in the 1990s. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and CLEAPSS <i>Laboratory Handbook</i> , section 14.4.2.
<i>Pupils using their own saliva in practical work</i>	No national ban. Has never been discouraged by UK government. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and CLEAPSS <i>Laboratory Handbook</i> , section 14.4.3.
<i>Pupils taking samples of their own blood</i>	No national ban. Was very strongly discouraged by DES in 1980s, but later modified. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and CLEAPSS <i>Laboratory Handbook</i> , section 14.4.1.
<i>Incubating 'finger dabs' on agar plates</i>	No national ban. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and CLEAPSS <i>Laboratory Handbook</i> , section 15.2.4.
<i>Use of bleach [sodium chlorate(I), sodium hypochlorite] as a disinfectant</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> , section 15.12.3.
<i>Burning peanuts in experiments</i>	No national ban but allergy is a common problem. There are alternatives. Risk assessment needed.	Leaflet PS64 <i>Are we allowed to ...? (Biology FAQs)</i> and CLEAPSS <i>Laboratory Handbook</i> , section 9.4.2.
<i>Demonstration of smoking machine</i>	No national ban but under the <i>Smoke-free (Exemptions and Vehicles) Regulations</i> or the equivalent in devolved administrations, it must be done in a designated fume cupboard (or outdoors). Risk assessment needed. Some or all of the department's fume cupboards can be designated in the departmental <i>Health & Safety Policy</i> or equivalent.	Guides L195 <i>Safer chemicals, safer reactions</i> , section 9 and L223 <i>Model Health and Safety Policy for Science Departments</i> section 6.1 (customisable version DL223).
<i>Using sphygmomanometers</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> , section 15.11.
<i>Using spirometers</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> , section 14.5.
Mainly chemistry		
<i>Using 'spirit' burners</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> , section 9.4.3 and guide L195 <i>Safer chemicals, safer reactions</i> , section 5.
<i>All use of solutions more concentrated than 0.4 mol dm⁻³ by pupils in Key Stage 3.</i>	No national ban. Risk assessment needed.	Guide L195 <i>Safer chemicals, safer reactions</i> , section 2 and individual CLEAPSS <i>Hazcards</i> .
<i>Exploding cans of custard powder, icing sugar, lycopodium powder or similar</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Supplementary Risk Assessments</i> SRA 02.
<i>Exploding cans containing methane / air mixtures</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 45A. See also CLEAPSS <i>Supplementary Risk Assessments</i> SRA 03 and SRA 12.

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
<i>Demonstrating explosions of hydrogen / oxygen mixtures</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 48 and guide L195 <i>Safer chemicals, safer reactions</i> , section 7.1, 7.2.
<i>Reducing heated copper(II) oxide with hydrogen</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcards</i> 26 and 48 and guide L195 <i>Safer chemicals, safer reactions</i> , section 7.3.
<i>Dropping potassium into water</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 76.
<i>Heating iron/sulfur mixtures</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcards</i> 55A and 96A and guide L195 <i>Safer chemicals, safer reactions</i> , section 9.2.
<i>Demonstrating the thermite reaction</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcards</i> 1 and 11 and guide L195 <i>Safer chemicals, safer reactions</i> , section 9.4.
<i>Use of benzene</i>	Banned nationally under the <i>COSHH (Amendment) Regulations</i> .	Alternatives exist for some purposes: see <i>CLEAPSS Hazcard</i> 46 and guide L195 <i>Safer chemicals, safer reactions</i> , section 6.
<i>Demonstrating the iodine/aluminium reaction</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcards</i> 1 and 54A.
<i>Using a blowpipe in lead oxide/charcoal reductions</i>	No national ban but to be avoided (except in a fume cupboard) if pregnant or nursing females present. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 56 and leaflet PS13 <i>New and expectant mothers taking part in school science</i> .
<i>Using bromine in diffusion demonstrations</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 15A and guide L195 <i>Safer chemicals, safer reactions</i> , section 8.
<i>Demonstrating ammonium dichromate volcano</i>	No national ban. Risk assessment needed. It is possible that the use of ammonium dichromate may eventually be banned under the <i>REACH Regulations</i> but this is some years away, if at all.	CLEAPSS <i>Hazcard</i> 7 and guide L195 <i>Safer chemicals, safer reactions</i> , section 9.
<i>Demonstration of 'howling jelly baby'</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Supplementary Risk Assessments</i> SRA 01.
<i>Use of genuine crude oil</i>	Banned under the <i>COSHH (Amendment) Regulations</i> as it contains more than 0.1% benzene.	'Synthetic' crude oil may be used as an alternative: see <i>CLEAPSS Hazcard</i> 45A and <i>CLEAPSS Recipe Book</i> sheet 32.
<i>Use of potassium (or ammonium) thiocyanate to test for iron(III)</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 9B.
<i>Use of 1,1,1-trichloroethane ('trike')</i>	Use for 'diffusive purposes' is banned under the <i>COSHH (Amendment) Regulations</i> .	See guide L195 <i>Safer chemicals, safer reactions</i> section 3 for alternatives or <i>Hazcard</i> 103. Note: this is not trichloroethene (trichloroethylene).
<i>Use of methanol</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 40B.
<i>Use of methanal (formaldehyde)</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 63.

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
<i>Use of mineral fibres</i>	Products containing asbestos are banned from sale under the <i>Control of Asbestos Regulations</i> but existing ones can continue in use if the fibres could not become air-borne. No national ban on other types. Risk assessment needed.	Guide L195 <i>Safer chemicals, safer reactions</i> , section 4 and CLEAPSS <i>Laboratory Handbook</i> 9.11.3.
<i>Use of naphthalene (moth balls)</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 46 and guide L195 <i>Safer chemicals, safer reactions</i> , section 12.
<i>Demonstration of reaction between sodium metal and chlorine</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcards</i> 22A and 88 and guide L195 <i>Safer chemicals, safer reactions</i> , section 9.
<i>Electrolysis of molten lead(II) bromide and other salts</i>	No national ban but to be avoided (except in a fume cupboard) if pregnant or nursing females present. Risk assessment needed.	CLEAPSS <i>Hazcards</i> 57A and 108A and guide L195 <i>Safer chemicals, safer reactions</i> , section 10.
<i>Demonstrations involving fuming nitric acid</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 67.
<i>Demonstrating reaction between propane-1,2,3-triol (glycerine) & potassium manganate(VII) (permanganate)</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 37.
<i>Electrolysis of sodium or copper chloride solutions in open laboratory.</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcards</i> 27A, 47B.
<i>Measuring rate of reaction of sodium thiosulfate with acid</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Hazcard</i> 95C and guide L195 <i>Safer chemicals, safer reactions</i> , section 13.
<i>Use of plaster of Paris</i>	No national ban. Risk assessment needed. Two serious accidents have occurred in art classes in which pupils' hands were badly burnt after becoming entrapped in large quantities of the plaster as it set	CLEAPSS <i>Hazcard</i> 19B and leaflet PS 72 <i>Using plaster of Paris in schools</i> .
<i>Making 'slime'.</i>	No national ban. Risk assessment needed. It is possible that the use of boron compounds may eventually be banned under the <i>REACH Regulations</i> but this is some years away, if at all.	CLEAPSS <i>Hazcard</i> 14 and CLEAPSS <i>Recipe Book</i> sheet 78.
Mainly physics		
<i>Use of model steam engines</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 9.7.1 and guide L214 <i>Examining autoclaves, pressure cookers and model steam engines</i> .
<i>Stretching metal wires and plastic filaments to breaking point</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.18.
<i>Use of air rifle in momentum demonstrations</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.4.6.

Allegedly-banned chemical or activity	Status of alleged ban	Guidance on healthy and safe practice and/or model risk assessments
<i>Use of starting pistol in speed of sound experiments</i>	No national ban on use of starting pistols. Risk assessment needed. However, under the <i>Violent Crime Reduction Act 2006 (Realistic Imitation Firearms) Regulations</i> it is illegal to have a blank-firing gun which looks like, or could be mistaken for, a real gun and this would include most older (pre-2006) starting pistols. Starting pistols which comply are coloured bright green, pink, orange, etc.	For guidance on safe use, see CLEAPSS <i>Laboratory Handbook</i> 12.4.6. For guidance on legislation on use of starting pistols, see CLEAPSS <i>Bulletin 140, Spring 2011, page 3.</i>
<i>Making pupils' hair stand on end with Van de Graaff generators</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.9.1.
<i>Use of Wimshurst machines</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.9.1.
<i>Use of stroboscopes</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.19.
<i>Use of mercury in barometers, manometers, Charles' law apparatus, etc</i>	No national ban. Risk assessment needed. There is a ban (from 2009) under <i>The Controls on Dangerous Substances and Preparations (Amendment) (No. 2) Regulations</i> on the <u>sale</u> of measuring instruments containing mercury (except antiques) to the <u>general public</u> . Schools are not the general public. Long-term aim to phase out all measuring instruments containing mercury when suitable replacements available. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.13 and <i>Hazcard</i> 61.
<i>Use of lycopodium powder</i>	No national ban. Risk assessment needed.	<i>Supplementary Risk Assessments</i> SRA 02.
<i>Showing magnetic fields with iron filings</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.22.
<i>Use of EHT equipment up to 5000 volts at less than 5 mA</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.9.2.
<i>Use of electron beam tubes, eg, Teltron tubes</i>	No national ban. Risk assessment needed.	CLEAPSS <i>Laboratory Handbook</i> 12.6 and 12.9.3.
<i>Demonstrating the power line at mains voltage on the transmission line</i>	No national ban. Risk assessment needed. HSE has advised against certain types of apparatus.	CLEAPSS <i>Laboratory Handbook</i> 12.9.6.
<i>Demonstrations using sealed radioactive sources</i>	No national ban. Risk assessment needed. Some limitations on the types of sources which can be used.	Guide L93 <i>Managing ionising radiations and radioactive substances.</i>
<i>Demonstrations using protactinium generators</i>	No national ban in most of the UK; discouraged in Scotland. Risk assessment needed.	Guide L93 <i>Managing ionising radiations and radioactive substances.</i>